What is claimed is:

1.   A packet switching apparatus comprising:

a plurality of lower layer processing units which are connected to physical output ports, and each of which carries out a process for a data link layer and a physical layer to a packet;

5

a table storing flow data including a routing data and a search key; and

a processing unit which searches said flow data from said table based on a search key of a routing packet received via one of said plurality of lower layer processing units, when said flow data for said search key of said routing packet is registered on said table, and selectively transfers said routing packet to one of said plurality of lower layer processing units based on said routing data of said searched flow data.

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2.   A packet switching apparatus according to claim 1, further comprising a packet memory, and

wherein said processing unit stores said received packet in said packet memory, and extracts said search key from said stored packet.

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3.   A packet switching apparatus according to claim 1, further comprising a processor carrying out a routing process of said routing packet in response to

a routing process request to output said routing data,

5 and

wherein said processing unit generates said routing process request to said processor, when said flow data for said search key of said routing packet is not registered on said table, and registers said

10 routing data as a part of said flow data for said search key on said table such that said flow data is fully registered, when said routing data is outputted from said processor.

4.   A packet switching apparatus according to claim 3, wherein said processing unit stores said search key of said routing packet in said table, when said flow data for said search key of said routing packet is not

5 registered on said table.

5.   A packet switching apparatus according to claim 1, wherein said routing data includes a port number specifying a physical output port, and

wherein said processing unit selects one of

5 said plurality of lower layer processing units based on said port number of said routing data of said flow data for said search key of said routing packet, and transfers said routing packet to said selected lower layer processing section.

6.   A packet switching apparatus according to claim
1, wherein said routing data includes a port number
specifying a physical output port, and

wherein said packet switching apparatus further

5   comprises a switch fabric connecting between said
processing unit and said plurality of lower layer
processing units, having an arbitration function and
addressing said routing packet to said lower layer
processing unit based on said port number.

7.   A packet switching apparatus comprising:

a plurality of lower layer processing units
which are connected to physical output ports, and each
of which carries out a process for a data link layer

5   and a physical layer to a packet;

a security unit carrying out encrypting and
decrypting processes to a first packet based on a
specific security data in response to encrypt and
decrypt instructions to produce a second packet,

10 respectively;

a table storing flow data including a search
key, routing data and security data; and

a processing unit which searches a flow data
from said table based on a search key of a routing

15 packet received via one of said plurality of lower
layer processing units in said packet memory, when
said flow data for said search key of said routing

packet is registered on said table and said flow data

includes said security data, said search key including

20 a destination address, transfers said security data of

said searched flow data as said specific security data,

said routing packet as said first packet, and one of

said encrypt and decrypt instructions to said security

unit, searches another flow data from said table based

25 on a search key of said second packet from said

security unit as a routing packet, when said another

flow data is registered on said table, and selectively

transfers said second packet to one of said plurality

of lower layer processing units based on said routing

30 data of said searched another flow data.

8.   A packet switching apparatus according to claim

7, wherein said processing unit generates one of said

encrypt and decrypt instructions based on said

destination address, when said flow data for said

5 search key of said routing packet is registered on

said table and said flow data includes said security

data.

9.   A packet switching apparatus according to claim

7, wherein when said flow data for said search key of

said routing packet received via said lower layer

processing unit is registered on said table and said

5 flow data does not includes said security data, said

processing unit handles said received routing packet as said second packet to search another flow data from said table based on a search key of said second packet.

10.   A packet switching apparatus according to claim 7, further comprising a processor carrying out a security process for said routing packet in response to a security process request to output said security

5   data for said routing packet, and

wherein said processing unit selectively generates said security process request to said processor based on said destination address, when said flow data for said search key of said routing packet

10   is not registered on said table, and registers said security data as a part of said flow data for said search key of said routing packet on said table such that said flow data is fully registered, when said security data is outputted from said processor.

11.   A packet switching apparatus according to claim 10, wherein said processing unit stores said search key of said routing packet in said table, when said flow data for said search key of said routing packet

5   is not registered on said table.

12.   A packet switching apparatus according to claim 7, further comprising a processor carrying out a

routing process of said routing packet in response to
a routing process request to output said routing data,
5 and

wherein said processing unit generates said
routing process request to said processor, when said
flow data for said search key of said routing packet
is not registered on said table, and registers said
10 routing data as a part of said flow data for said
search key on said table such that said flow data is
fully registered, when said routing data is outputted
from said processor.

13.   A packet switching apparatus according to claim
12, wherein said processing unit stores said search
key of said routing packet in said table, when said
flow data for said search key of said routing packet
5 is not registered on said table.

14.   A packet switching apparatus according to claim
7, wherein said routing data includes a port number
specifying a physical output port, and
wherein said processing unit selects one of
5 said plurality of lower layer processing units based
on said port number of said routing data of said flow
data for said search key of said routing packet, and
transfers said second packet said selected lower layer
processing section.

15.   A packet switching apparatus according to claim
7, wherein said routing data includes a port number
specifying a physical output port, and

        wherein said packet switching apparatus further
5   comprises a switch fabric connecting between said
processing unit, said security unit and said plurality
of lower layer processing units, having an arbitration
function and addressing said second packet to said
lower layer processing unit based on said port number.

16.   A packet switching apparatus comprising:
        a plurality of lower layer processing units
which are connected to physical output ports, and each
of which carries out a process for a data link layer
5   and a physical layer to a packet;
        a security unit carrying out encrypting and
decrypting processes to a first packet based on a
specific security data in response to encrypt and
decrypt instructions to produce a second packet,
10 respectively, and selectively transfers said second
packet to one of said plurality of lower layer
processing units based on said routing data;
        a table storing flow data including a search
key, routing data and security data; and
15   a processing unit which searches a flow data
from said table based on a search key of a routing
packet received via one of said plurality of lower

layer processing units in said packet memory, when
said flow data for said search key of said routing

20   packet is registered on said table and said flow data
includes said security data, said search key including
a destination address, transfers said security data of
said searched flow data as said specific security data,
said routing packet as said first packet, and one of

25   said encrypt and decrypt instructions to said security
unit together with said routing data.

17.   A packet switching apparatus according to claim
16, wherein said processing unit generates one of said
encrypt and decrypt instructions based on said
destination address, when said flow data for said

5   search key of said routing packet is registered on
said table and said flow data includes said security
data.

18.   A packet switching apparatus according to claim
16, wherein when said flow data for said search key of
said routing packet received via said lower layer
processing unit is registered on said table and said

5   flow data does not includes said security data, said
processing unit selectively transfers said second
packet to one of said plurality of lower layer
processing units based on said routing data of said
searched flow data.

19.   A packet switching apparatus according to claim 16, further comprising a processor carrying out a routing process of said routing packet in response to a process request to output said routing data, and

5   selectively carrying out a security process for said routing packet based on said destination address of said routing packet in response to said process request to output said security data for said routing packet, and

10   wherein said processing unit generates said process request to said processor, when said flow data for said search key of said routing packet is not registered on said table, and registers said routing data and said security data from said processor as a

15   part of said flow data for said search key of said routing packet on said table such that said flow data is fully registered.

20.   A packet switching apparatus according to claim 19, wherein said processing unit stores said search key of said routing packet in said table, when said flow data for said search key of said routing packet

5   is not registered on said table.

21.   A packet switching apparatus according to claim 19, wherein when said flow data for said search key of said routing packet is not registered on said table,

said processing unit outputs said routing data and

5   said security data as said specific security data from

said processor, said routing packet as said first

packet, and one of said encrypt and decrypt

instructions to said security unit.

22.   A packet switching apparatus according to claim

16, wherein said routing data includes a port number

specifying a physical output port, and

        wherein said security unit selects one of said

5   plurality of lower layer processing units based on

said port number of said routing data of said flow

data for said search key of said routing packet, and

transfers said transmission packet said selected lower

layer processing section.

23.   A packet switching apparatus according to claim

16, wherein said routing data includes a port number

specifying a physical output port, and

        wherein said packet switching apparatus further

5   comprises a switch fabric connecting between said

processing unit, said security unit and said plurality

of lower layer processing units, having an arbitration

function and addressing said second packet to said

lower layer processing unit based on said port number.

24.   A method of switching a routing packet

comprising:

searching a table for a flow data based on a search key of a routing packet, said flow data including a routing data and said search key; and

transferring said routing packet to a physical output port determined based on a destination address of said routing packet, when said flow data for said search key of said routing packet is registered on said table.

25.   A method according to claim 24, further comprising:

registering said search key on said table when said flow data for said search key of said routing packet is not registered on said table;

carrying out said routing process of said routing packet, when said flow data for said search key of said routing packet is not registered on said table; and

registering said routing data as a part of said flow data for said search key on said table such that said flow data is fully registered.

26.   A method of switching a routing packet comprising:

searching a table for a flow data based on a search key of a routing packet, said flow data

5   including said search key, routing data and security
data, and said search key including a destination
address;

      selectively generating one of said encrypt and
decrypt instructions based on said destination

10   address;

      carrying out one of an encrypting process or a
decrypting processes to said routing packet based on
said security data in response to said generated
instruction, when said flow data for said search key

15   of said routing packet is registered on said table and
said flow data includes said security data, to produce
another routing packet;

      outputting said another routing packet as a
transmission packet to a physical output port.

27.   A method according to claim 26, further
comprising:

      outputting said transmission packet to a
physical output port based on said searched routing

5   data.

28.   A method according to claim 26, further
comprising:

      searching said table for a flow data based on a
search key of said transmission packet; and

5   transferring said transmission packet to a

physical output port determined based on a destination
address of said transmission packet when said flow
data for said search key of said routing packet is
registered on said table.

29.   A method according to claim 26, further
comprising:

    when said flow data for said search key of said
routing packet is registered on said table and said
5   flow data does not includes said security data,
selectively transferring said transmission packet to
said physical output port based on said routing data
of said searched flow data.

30.   A method according to claim 26, further
comprising:

    generating a process request, when said flow
data for said search key of said routing packet is not
5   registered on said table;

    carrying out a routing process of said routing
packet in response to said process request to output
said routing data;

    selectively carrying out a security process for
10 said routing packet based on said destination address
of said routing packet in response to said process
request to output said security data for said routing
packet; and

registering said routing data and said security

15 data as a part of said flow data for said search key

of said routing packet such that said flow data is

fully registered.

31.   A method according to claim 30, wherein said

registering includes:

registering said search key of said routing

packet in said table, when said flow data for said

5 search key of said routing packet is not registered on

said table.